(iv) *The thermal expansion*

From the relationship (3) and from the compressibility the volume thermal expansion coefficient, α, can be derived. Table 6 shows the variation of the expansion coefficient with temperature at three different densities.

TABLE 6. THE THERMAL EXPANSION OF SOLID HELIUM; THE VOLUME EXPANSION COEFFICIENT AS A FUNCTION OF TEMPERATURE

T (°K)	10·6 ml. $10^4\alpha$	12 ml. $10^4\alpha$	15 ml. $10^4\alpha$
0	0	0	0
2	—	—	1·05
4	0·09	0·48	10·2
8	0·93	4·9	—
12	3·4	14·6	—
16	7·3	—	—
20	12·6	—	—

(v) *The internal energy at* 0° K *and the lattice energy*

By integrating the p, V relationship at 0° K the internal energy at absolute zero, U_0, can be obtained as a function of volume. In this calculation, the value of U_0 at 25 atm pressure is taken as −11·9 cal/mole (Simon & Swenson 1950;

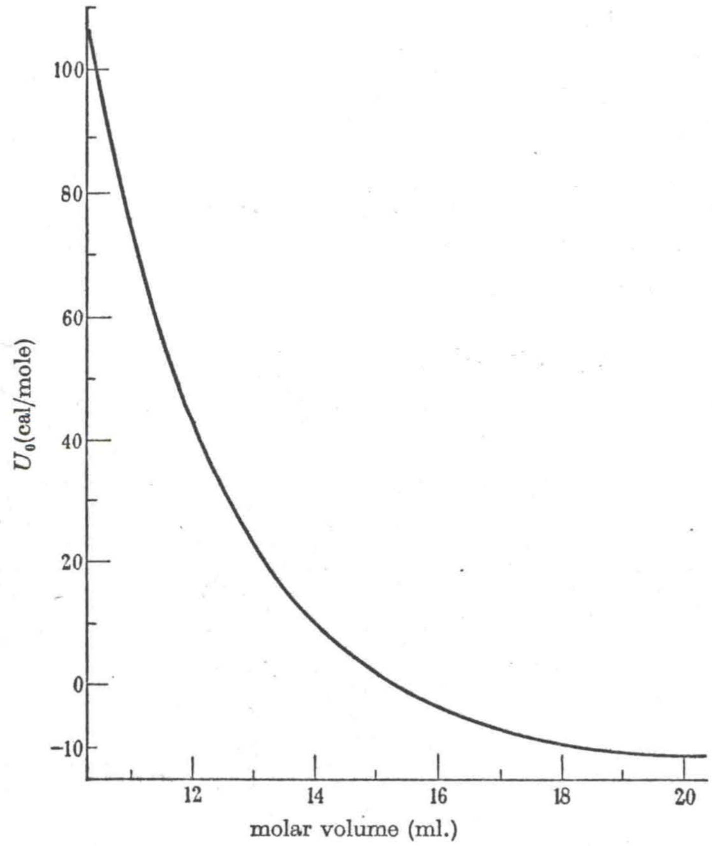

FIGURE 11. The internal energy of solid helium at 0° K as a function of volume.